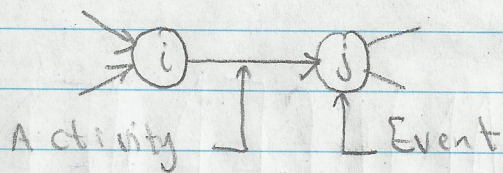


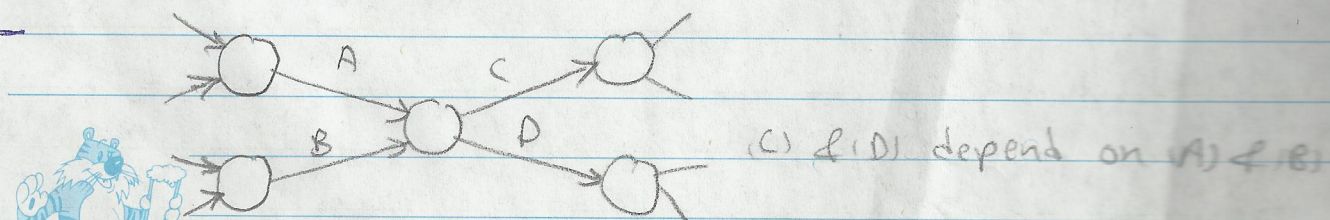
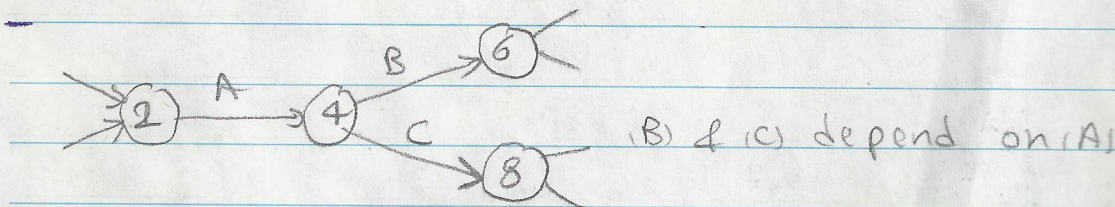
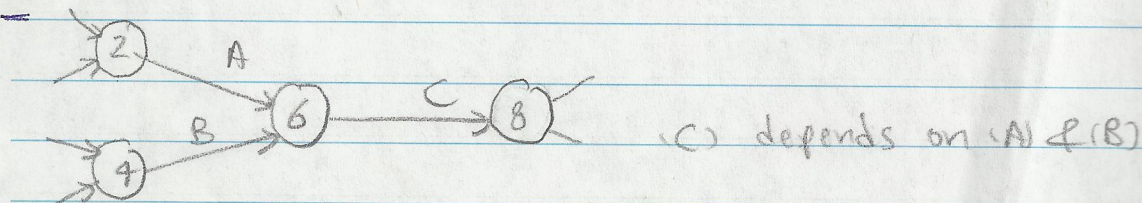
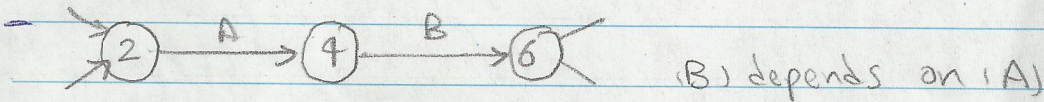
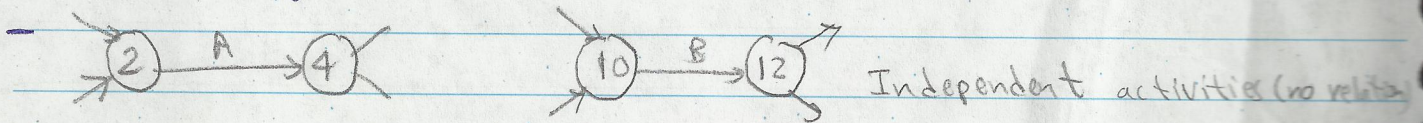
1- Basic arrow diagramming

* Arrow diagramming is used to represent activities in a time-scaled diagram

- Arrow length has no significance
- Arrow form \rightarrow Straight, curved, bent or wavy to suit mode
- Each activity has begining & end \Rightarrow Events

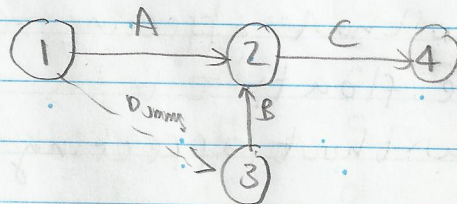
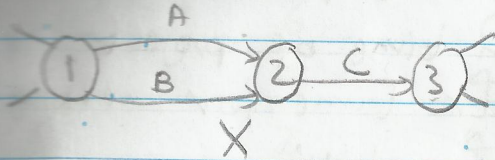


* Dependency :



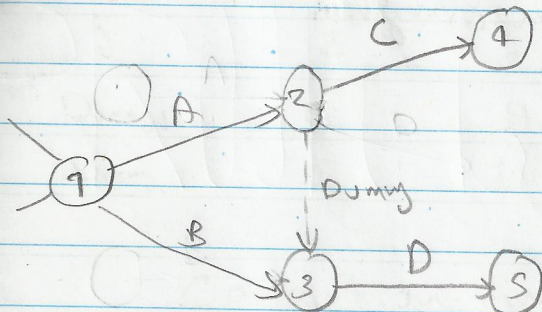
* Dummy activity;

2 activities of same events



Mutual exclusive dependency

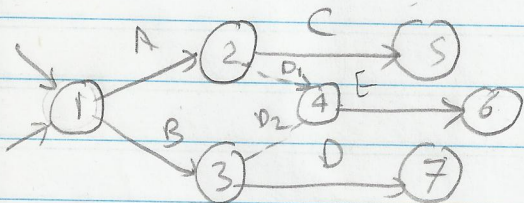
$$C = f(A), \quad D = f(A, B)$$



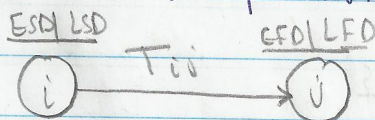
(one dummy)

Mutual exclusive dependency

$$C = f(A), \quad D = f(B), \quad E = f(A, B)$$



* Time scale values of activity;



(ESD) Early start duration

(LSD) Last start duration

(EFD) Early finish duration

(LFD) Last finish duration

(T) Activity duration time

$$EFD = ESD_i + T_{ij}$$

$$LSD = LFD_j - T_{ij}$$

- * Critical activity: $ES_{\text{activity}} = LS_{\text{previous activity}}$
- Total float; It is the slack time for activity to delay without affecting completion time of project
- Free float; It is the slack time for activity to delay without affecting the next activity

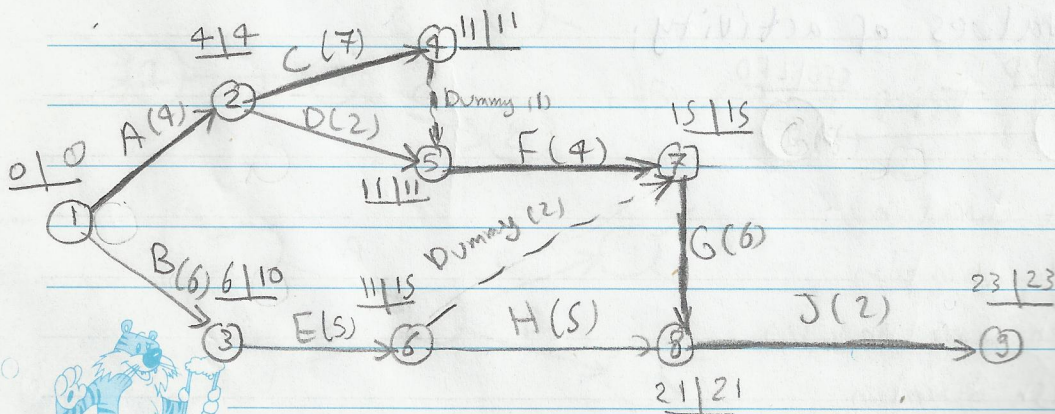
$$TF = LFD - ESD - T = LF - EF \Rightarrow \text{From diagram}$$

$$FF = EFD - ESD - T \Rightarrow \text{From diagram}$$

$$ES \rightarrow EF \quad \& \quad LF \rightarrow LS$$

Example;

Activity	Predecessor	Duration
A	—	4
B	—	6
C	A	7
D	A	2
E	B	5
F	C, D	4
G	E, F	6
H	E	5
J	G, H	2



Activity	Duration	ES	LS	EF	LF	FF	TF
A	4	0	0	4	4	0	0
B	6	0	4	6	10	0	4
C	7	4	4	11	11	0	0
D	2	4	9	6	11	5	5
E	5	6	10	11	15	0	4
F	4	11	11	15	15	0	0
G	6	15	15	21	21	0	0
H	5	11	16	16	21	5	5
J	2	21	21	23	23	0	0
Dummy 1	0	11	11	11	11	0	0
Dummy 2	0	11	15	11	15	4	4

Completion time = 23 units of time

Critical path : A - C - Dummy₁ - F - G - J

↳ FF = TF = 0